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| 09/998,534      | 11/28/2001  | Noriyoshi Nishiyama  | MAT-7941US1         | 6235             |

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EXAMINER

MULLINS, BURTON S

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2834

DATE MAILED: 02/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/998,534

Applicant(s)

NISHIYAMA ET AL.

Examiner

Burton S. Mullins

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/945,460.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 2834

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on 28 November 2001 has been considered by the examiner.

### *Priority*

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 08/945,460, filed on 2 February 1998.

### *Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 2n rotor magnets combined with the 3n stator poles must be shown for the embodiments of claims 5-6 or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 5-6 and 9 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claims 5-6, the combination of  $2n$  rotor magnets and  $3n$  stator poles with “at least one of said plurality of permanent magnets [having] a side facing said stator core which is angled inward towards the center” (claim 5) or “a first outer periphery portion of said rotor is different than a second outer periphery portion...” (claim 6) are not described in the specification. Specifically, while groups of plural layers are described (Fig.6), the combination of such a rotor having  $2n$  magnets with a stator having  $3n$  poles is not described in the specification or shown in the drawings. For the example in Fig.5, there are sixteen magnets comprising the eight rotor poles. Thus,  $n=8$  according to claim 1 and there should be twenty-four stator poles, not the twelve shown. The specification does not clarify the matter. For the example of Fig.6, since there are eight rotor magnets ( $n=4$ ), there should be twelve stator poles according to claim 1. However, there are in fact twenty-four stator poles shown. In claim 6, the “second outer periphery portion...positioned in the stator core” is not described in the specification. It appears that the second outer periphery portion is positioned in the rotor core (specification pp.17-19, Fig.6). Further, the embodiment of claim 9 is not disclosed in the specification. Specifically, while groups of plural layers are described

Art Unit: 2834

(Fig.6), the combination of such a rotor having  $2n$  magnets with a stator having  $3n$  poles is not described in the specification or shown in the drawings. For the example of Fig.6, since there are eight rotor magnets ( $n=4$ ), there should be twelve stator poles according to claim 1.

However, there are in fact twenty-four stator poles shown.

6. Claims 3, 6 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 3, it is not clear if the plurality of magnets as a whole is larger in pitch relative to the stator coil pitch, or if applicant means each magnet's pole pitch is larger than each stator coil pitch. Presumably, the latter interpretation is true. In claim 6, recitation "a first outer periphery portion of said rotor is different than a second outer periphery portion of said rotor" is indefinite. It appears from Fig.6 that the periphery of the rotor is uniform. The periphery of the rotor magnets, however, varies. Claim 8 is a duplicate of claim 7 and thus fails to further limit claim 1.

7. In view of both first - and second-paragraph 35 USC 112 rejections of claim 6, prior art has not been applied to the claim.

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-2, 4 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura (US 3,634,873) in view of Kawamoto et al. (US 4,954,736). Nishimura teaches a compressor comprising a compressor mechanism 14 for compressing and discharging a medium, e.g., a refrigerant (Fig.1, c.3, lines 57-67); a permanent magnet rotor DC motor 12 driving the compressor mechanism 14; a stator core with a six teeth or salient pole sections 22a-22f ( $n=2$  in Nishimura) and concentrated windings 32, 34, 36 applied over each of the teeth, respectively; a rotor rotatably mounted in the stator core, the rotor incorporating four poles.

Nishimura differs in that, while there are four poles, there are not “a plurality of  $2n$  permanent magnets,” where  $n=2$ . Rather, in Nishimura, the permanent magnet rotor 24 is magnetized on its outer periphery to provide four poles (c.3, lines 40-42).

Kawamoto teaches a permanent magnet rotor comprising four individual permanent magnet segments 17a-17d (Figs.1-2) peripherally mounted on a yoke 12 and magnetized radially to have alternating opposite polarity in the circumferential direction (c.5, lines 7-12). The utilization of individual permanent magnet segments improves the magnetic force of the rotor and facilitates manufacture (c.1, lines 18-28; c.5, lines 13-27).

It would have been obvious to one having ordinary skill at the time of the invention to modify Nishimura's permanent magnet rotor and provide individual permanent magnet segments per Kawamoto since this would have been desirable to improve the magnetic force of the rotor and facilitate manufacture.

Regarding claim 2, the yoke 12 in Kawamoto is made of magnetic material. Iron is a well-known magnetic material.

Regarding claim 4, note that the magnets in Kawamoto include ends angled towards one another by an angle of  $\alpha$  (Fig.2).

Regarding claims 12-14, the examiner takes official notice that refrigerants such as those used in the compressor of Nishimura includes HFCs, carbon dioxides or HC.

10. Claims 1-3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mashita (JP 9-19120) in view of Nishimura (US 3,634,873). Mashita teaches a permanent magnet synchronous motor including a stator core with a three teeth (Fig.11) (thus,  $n=1$ ) and concentrated windings 6/7, 8/9 and 10/11 applied over each of the teeth, respectively; a rotor 2 rotatably mounted in the stator core, the rotor incorporating two magnets 3 forming two poles.

Mashita does not teach that his motor is used in a compressor, per se.

Nishimura teaches a permanent magnet motor 12 employed in a compressor to driving the compressor mechanism 14. Such motors are particularly useful in refrigeration systems.

It would have been obvious to one having ordinary skill in the art to use Mashita's permanent magnet motor to drive a compressor per Nishimura since the motor would be desirable in refrigeration systems to drive the compressor mechanism.

Art Unit: 2834

Regarding claim 3, as best understood, note that the pitch of each magnet pole in Mashita is larger than each stator pole pitch.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura (US 3,634,873) in view of Kawamoto et al. (US 4,954,736) and Baumann et al. (US 3,840,763). Nishimura teaches a compressor comprising a compressor mechanism 14 for compressing and discharging a medium, e.g., a refrigerant (Fig.1, c.3, lines 57-67); a permanent magnet rotor DC motor 12 driving the compressor mechanism 14; a stator core with a six teeth or salient pole sections 22a-22f ( $n=2$  in Nishimura) and concentrated windings 32, 34, 36 applied over each of the teeth; a rotor rotatably mounted in the stator core, the rotor incorporating four poles.

Nishimura differs in that, while there are four poles, there are not “a plurality of  $2n$  permanent magnets,” where  $n=2$ . Rather, in Nishimura, the permanent magnet rotor 24 is magnetized on its outer periphery to provide four poles (c.3, lines 40-42). Neither does Nishimura teach “at least one of the plurality of permanent magnets has a side facing said stator core which is angled inward towards the center.”

Regarding the former feature, Kawamoto teaches a permanent magnet rotor comprising four individual permanent magnet segments 17a-17d (Figs.1-2) peripherally mounted on a yoke 12 and magnetized radially to have alternating opposite polarity in the circumferential direction (c.5, lines 7-12). The utilization of individual permanent magnet segments improves the magnetic force of the rotor and facilitates manufacture (c.1, lines 18-28; c.5, lines 13-27).

Regarding the latter feature, Baumann teaches a permanent magnet rotor including plural magnets 12 mounted within a particular angular orientation with respect to the main flux



paths (and by extension, the rotor axis). This improves power output and pullout torque (c.1, line 55-c.2, line 14).

It would have been obvious to one having ordinary skill at the time of the invention to modify Nishimura's permanent magnet rotor and provide individual permanent magnet segments per Kawamoto since this would have been desirable to improve the magnetic force of the rotor and facilitate manufacture; and further to provide magnets angled with respect to the center of the rotor per Baumann since this would have been desirable to improve power output and pullout torque.

12. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura and Kawamoto as applied to claim 1 above, and further in view of Fukuda et al. (US 5,553,465).

Nishimura and Kawamoto do not teach a refrigeration cycle with a heat exchanger.

Fukuda teaches the standard refrigeration cycle (Fig.2, c.15, line 64-c.16, line 20) for an air conditioner in a refrigerator, including compressor 40 and heat exchanger (condenser) 41.

It would have been obvious to employ the compressor of in a refrigeration cycle per Fukuda since the compressor is necessary to compress the refrigerant.

13. Claim 9, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura and Kawamoto as applied to claim 1 above, and further in view of Murakami et al. (JP 08-336,246). Nishimura and Kawamoto do not teach plural magnet layers in the rotor.

Art Unit: 2834

Murakami teaches a motor having a rotor 3 comprising layered sets of magnets 8a,8b so as to relax the concentration of flux at specific points on the rotor, thus reducing iron losses (abstract).

It would have been obvious to include layers of magnets per Murakami in the combination of Nishimura and Kawamoto since it would have been desirable to relax the concentration of flux at specific points on the rotor periphery to reduce iron losses.

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura and Kawamoto as applied to claim 1 above, and further in view of Uchida et al. (US 5,763,978). Nishimura and Kawamoto do not teach that the interval between teeth is smaller than the winding width.

Uchida teaches synchronous motors (Figs.9-10) having stator teeth with hooks 6 and openings 7 therebetween. The hooks prevent the windings 5 from slipping out of the slots (c.1, lines 37-38). The openings 7 are much smaller than the width of each winding 5 (Fig.9).

It would have been obvious to include hooks per Uchida in the combination of Nishimura and Kawamoto since it would have been desirable to keep the windings from slipping out of the slots.

### *Conclusion*

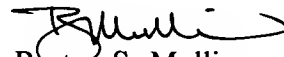
15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The

Art Unit: 2834

examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 305-1341 for regular communications and 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.



Burton S. Mullins  
Primary Examiner  
Art Unit 2834

bsm  
February 13, 2003